IN THE CLAIMS:

1. (Currently Amended) An electrochemical sensing device wherein analyte-selective organic materials are suspended over a cavity, said cavity penetrating alternating submicroelectrode layers and insulating layers, said submicroelectrode layers having embedded electrodes in said cavity's walls, top opening and entire bottom of said cavity, and wherein said analyte selective organic materials being suspended such that they do not come in contact with the submicroelectrodes in the walls or bottom of the cavity.

2. (Currently amended) A microcavity device comprising:

(a) a flexible polymer substrate;

(b) at least three integrated, independently addressable electrodes, wherein one of the electrodes is a disk electrode attached to an adhesion layer which is deposited on the substrate and covering the entire substrate and bottom of the microcavity and not used as a reference electrode, wherein at least one of the electrodes is nanoband or ring electrode embedded along walls of said microcavity, and wherein one of the electrodes is a ring electrode along the top opening of said microcavity;

(c) conducting layers connected to said electrodes, said conducting layers being planar and parallel to one another and comprising contact pads;

(d) an insulating layer separating adjacent conducting layers;

(e) said conducting layers and insulating layer being on top of said substrate; ~~and,~~

(f) at least one microcavity penetrating said conducting layers and said insulating layer, said microcavity having a depth, a diameter and a top opening;

(g) adhesion layers between the insulating and conducting layers and the conducting layer and the substrate;

(h) said substrate comprising kapton, polydimethylsiloxane (PDMS), benzoclyclobutene (BCB), polymethylmethacrylate (PMMA), polyethylene terephthalate (PET), parylene, or polyimide; and

(i) said insulating layers comprising polyimide, kapton, or polydimethylsiloxane (PDMS).

3. (Original) The microcavity device of claim 2 wherein a thin film membrane covers said top opening.

4. (Original) The microcavity device of claim 3 wherein said membrane selectively permits mass transfer across said membrane.

5. (Original) The microcavity device of claim 3 wherein said membrane permits selective mass transfer of an analyte into said microcavity, selectively permits mass transfer of an analyte from said microcavity, and selectively prevents mass transfer of substances which are not analytes into said microcavity.

6. (Original) The microcavity device of claim 2 wherein said height of said microcavity is less than 1 millimeter.

7. (Original) The microcavity device of claim 2 wherein said diameter of said microcavity is less than 1 millimeter.

8. (Canceled)

9. (Canceled)

10. (Original) The microcavity device of claim 2 wherein a volume of said microcavity is between one femtoliter and one picoliter.

11. (Original) The microcavity device of claim 2, wherein said device includes a plurality of microcavities forming a multiple well array.

12. (Original) The microcavity device as recited in claim 11, wherein said array includes at least 96 wells.

13. (Original) The microcavity device of claim 2, wherein said microcavity device provides at least one electrochemical cell.

14. (Original) The microcavity device of claim 2, wherein said device is a recessed disk microelectrode.

15. (Currently amended) A microcavity device comprising:

(a) a ~~silicon wafer~~ rigid substrate;

(b) at least three integrated, independently addressable electrodes, wherein one of the electrodes is a disk electrode attached to an adhesion layer which is deposited on the substrate and covering the entire bottom of the microcavity and not used as a reference electrode, wherein at least one of the electrodes is nanoband or ring electrode embedded along walls of said microcavity, and wherein one of the electrodes is a ring electrode along the top opening of said microcavity;

(c) conducting layers connected to said electrodes, said conducting layers being planar and parallel to one another and comprising contact pads;

(d) an insulating layer separating adjacent conducting layers;

(e) said conducting layers and insulating layer being on top of said substrate; ~~and;~~

(f) at least one microcavity penetrating said conducting layers and said insulating layer, said microcavity having a depth, a diameter and a top opening;

(g) adhesion layers between the insulating and conducting layers and the conducting layer and the substrate;

(h) said substrate comprising silicon wafer, glass, mica or ceramics; and

(i) said insulating layers comprising polyimide, kapton, or polydimethylsiloxane (PDMS).

16. (Canceled)

17. (Currently amended) The microcavity device as recited in claim ~~16~~ 15, further comprising:

(i) a thin film membrane covering said top opening; and

(ii) wherein said membrane selectively permits mass transfer across said membrane.

18. (Original) The microcavity device of claim 17 wherein said membrane permits selective mass transfer of an analyte into said microcavity, selectively permits mass transfer of an analyte from said microcavity, and selectively prevents mass transfer of substances which are not analytes into said microcavity.

19. (Currently amended) The microcavity device of claim ~~16~~ 15 wherein said depth of said microcavity is less than one millimeter.

20. (Currently amended) The microcavity device of claim ~~16~~ 15 wherein said diameter of said microcavity is less than one millimeter.

21. (Currently amended) The microcavity device of claim ~~16~~ 15 wherein said electrodes are selected from a group consisting of band electrodes and disk electrodes.

22. (Currently amended) The microcavity device of claim ~~16~~ 15 wherein there are at least two electrodes.

23. (Currently amended) The microcavity device of claim ~~16~~ 15 wherein the volume of said microcavity is between one femtoliter and one picoliter.

24. (Currently amended) The microcavity device of claim ~~16~~ 15 wherein said device includes a plurality of micro-cavities forming a multiple well array.

25. (Currently amended) The microcavity device of claim 24 wherein said array includes at least 96 wells.

26. (Currently amended) The microcavity device of claim ~~16~~ 15 wherein said device is a recessed disk microelectrode.

27. (Canceled)

28. (Canceled)

29. (Canceled)

30. (Canceled)

31. (Canceled)

32. (Previously amended) A microcavity device for detecting amino acids, comprising:

(a) a silicon wafer to act as a substrate for the microcavity device;

(b) conductor layers;

(c) electrodes connected to said conductor layers, wherein one of the electrodes is a microdisk electrode on the substrate and covering the bottom of the microcavity and not used as a reference electrode;

(d) a polyimide insulating layer to separate said conductor layers; and

(e) a microcavity penetrating at least one electrode and at least one insulating layer, wherein said conductor layers and said electrodes are made of at least one of gold and copper.

33. (Original) The microcavity device of claim 32 wherein a thin film membrane covers said microcavity.

34. (Original) The microcavity device of claim 33 wherein said membrane permits selective mass transfer of an analyte into said microcavity, selectively permits mass transfer of an analyte from said microcavity, and selectively prevents mass transfer of substances which are not analytes into said microcavity.

35. (Original) The microcavity device of claim 32 wherein said microcavity further comprises a depth and a diameter and wherein said depth of said microcavity is less than one millimeter.

36. (Original) The microcavity device of claim 35 wherein said diameter of said microcavity is less than one millimeter.

37. (Original) The microcavity device of claim 32 wherein said electrodes are selected from a group consisting of band electrodes and disk electrodes.

38. (Original) The microcavity device of claim 32 wherein there are at least two electrodes.

39. (Original) The microcavity device of claim 32 wherein the volume of said microcavity is between one femtoliter and one picoliter.

40. (Original) The microcavity device of claim 32 wherein said device includes a plurality of microcavities forming a multiple well array.

41. (Original) The microcavity device of claim 40 wherein said array includes at least 96 wells.

42. (Original) The microcavity device of claim 32 wherein said microcavity device provides at least one electrochemical cell.

43. (Original) The microcavity device of claim 32 wherein said device is a recessed disk microelectrode.

44. (Canceled)

45. (Canceled)

46. (Canceled)

47. (Canceled)

48. (Canceled)

1 49. (Canceled)

1 50. (Canceled)